

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently amended) An information providing A-warning apparatus for a vehicle, comprising:
an operation part configured to provide a contact possibility of the vehicle contacting
with an object that is present in front of the vehicle according to relative motion between the
vehicle and the object;
an information providing a-warning unit configured to provide [[a]] contact possibility
information warning by applying a negative acceleration to the vehicle, the negative acceleration
being produced according to a correction value that is set by the information providing warning
unit according to the contact possibility and is applied to at least one of the driving force and the
braking force of the vehicle; and
a controller configured to change the correction value according to a speed of the
vehicle.
2. (Currently amended) The information providing warning apparatus of claim 1, wherein:
the information providing warning unit sets a first correction value according to a first
collision time, to produce the negative acceleration, the first collision time being provided by the
operation part unit according to a distance between the vehicle and the front object and a relative
speed of between the vehicle and the front object; and
the controller changes the first correction value such that the first correction value
decreases increases as the speed of the vehicle increases.
3. (Currently amended) The information providing warning apparatus of claim 1, wherein:
the information providing warning unit sets a second correction value according to a second
collision time, to produce the negative acceleration, the second collision time being provided by
the operation part unit according to a distance between the vehicle and the front object and a
relative speed between of the vehicle and the front object;
and

the controller changes the second correction value such that the second correction value increases decreases as the speed of the vehicle increases.

4. (Currently amended) The information providing warning apparatus of claim 2, wherein:

the information providing warning unit sets a second correction value according to a second collision time, which is provided by the operation part unit according to the distance between the vehicle and the front object and a relative speed between of the vehicle and the front object, and selects a larger one of the first and second correction values to produce the negative acceleration; and

the controller changes the second correction value such that the second correction value increases decreases as the speed of the vehicle increases.

5. (Currently amended) The information providing warning apparatus of claim 4, wherein the second correction value is set according to a comparison between the second collision time and a second threshold and according to the second collision time.

6. (Currently amended) The information providing warning apparatus of claim 5, wherein the first correction value is set according to a comparison between the first collision time and a first threshold and according to the first collision time.

7. (Currently amended) The information providing warning apparatus of claim 5, wherein the second correction value is set to zero in a case where the second collision time is greater than the second threshold, and in other cases, is increased as the second collision time decreases.

8. (Currently amended) The information providing warning apparatus of claim 6, wherein the first correction value is set to zero in a case where the first collision time is greater than the first threshold, and in other cases, is increased as the first collision time decreases.

9. (Currently amended) The information providing warning apparatus of claim 4, further comprising:

a classifier configured to classify a road on which the vehicle is running, wherein in a case where the classifier classifies the road as an open road, the controller increases the first correction value than that for an expressway.

10. (Currently amended) The information providing warning apparatus of claim 4, further comprising:

a classifier configured to classify a road on which the vehicle is running, wherein in a case where the classifier classifies the road as an open road, the controller uses a greater increases the second correction value than that for an expressway.

11. (Currently amended) The information providing warning apparatus of claim 9, wherein in a case where the classifier classifies the road as an open road, the controller uses a greater increases the second correction value than that for an expressway.

12. (Currently amended) An information providing A-warning apparatus for a vehicle, comprising:

an operation means configured to provide a contact possibility of the vehicle contacting with an object that is present in front of the vehicle according to relative motion between the vehicle and the object;

an information providing a warning means configured to provide [[a]] contact possibility information warning by applying a negative acceleration to the vehicle, the negative acceleration being produced according to a correction value that is set by the information providing warning means according to the contact possibility and is applied to at least one of the driving force and the braking force of the vehicle; and

a control means configured to change the correction value according to a speed of the vehicle.

13. (Currently amended) An information providing A-warning method for a vehicle, comprising:

providing a contact possibility of the vehicle contacting with an object that is present in front of the vehicle according to relative motion between the vehicle and the object;

providing contact possibility information by producing a negative acceleration according to a correction value that is set according to the contact possibility and is applied to at least one of the driving force and the braking force of the vehicle; and

warning to provide a contact possibility warning by applying the negative acceleration to the vehicle; and

controlling to change changing the correction value according to a speed of the vehicle.

14. (New) An information providing apparatus for a vehicle, comprising:
 - an operation part configured to provide a contact possibility of the vehicle contacting with an object that is present in front of the vehicle according to relative motion between the vehicle and the object;
 - an information providing unit configured to provide contact possibility information by applying a negative acceleration to the vehicle, the negative acceleration being produced according to a correction value that is set by the information providing unit according to the contact possibility and is applied to at least one of the driving force and the braking force of the vehicle; and
 - a controller configured to change the correction value according to a speed of the vehicle;
 - wherein the controller is configured to determine the correction value based upon a counter force;
 - wherein the controller is configured to determine a collision time;
 - wherein the controller is configured to determine a collision time threshold;
 - wherein the controller is configured to determine if the collision time is less than the collision time threshold, wherein if the collision time is not less than the collision time threshold the counter force is set to be zero, and wherein if the collision time is less than the collision time threshold, the counter force is determined.
15. (New) The information providing apparatus of claim 14, wherein the collision time includes a first collision time based upon a distance between the vehicle and the object, and upon the speed of the vehicle;
 - wherein the collision time threshold includes a first collision time threshold.
16. (New) The information providing apparatus of claim 15, wherein the collision time includes a second collision time based upon the distance between the vehicle and the object, and upon a relative speed between the vehicle and the object;
 - wherein the collision time threshold includes a second collision time threshold.
17. (New) The information providing apparatus of claim 14, wherein the counter force is based upon a virtual member.

18. (New) The information providing apparatus of claim 15, wherein the counter force includes a first counter force based upon a first virtual elastic member with a first spring length and a first elastic coefficient.
19. (New) The information providing apparatus of claim 18, wherein the first counter force is determined on the basis of the first elastic coefficient, the first spring length, and the distance between the vehicle and the object.
20. (New) The information providing apparatus of claim 18, wherein the counter force includes a second counter force based upon a second virtual elastic member with a second spring length and a second elastic coefficient.
21. (New) The information providing apparatus of claim 20, wherein the second counter force is determined on the basis of the second elastic coefficient, the second spring length, and the distance between the vehicle and the object.
22. (New) The information providing apparatus of claim 18, further comprising:
 - a classifier configured to classify a road on which the vehicle is running;
 - wherein the first collision time threshold depends upon the speed of the vehicle and a classified road type that is determined by the classifier;
 - wherein the first elastic coefficient depends upon the speed of the vehicle and a classified road type that is determined by the classifier.
23. (New) The information providing apparatus of claim 20, further comprising:
 - a classifier configured to classify a road on which the vehicle is running;
 - wherein the collision time includes a second collision time based upon the distance between the vehicle and the object, and upon a relative speed between the vehicle and the object;
 - wherein the collision time threshold includes a second collision time threshold;
 - wherein the second collision time threshold depends upon the speed of the vehicle and a classified road type that is determined by the classifier;
 - wherein the second elastic coefficient depends upon the speed of the vehicle and a classified road type that is determined by the classifier.

24. (New) The information providing apparatus of claim 18, wherein the controller is configured to determine the first spring length on the basis of the first collision time threshold and the speed of the vehicle.

25. (New) The information providing apparatus of claim 20, wherein the collision time includes a second collision time based upon the distance between the vehicle and the object, and upon a relative speed between the vehicle and the object;

wherein the collision time threshold includes a second collision time threshold;

wherein the controller is configured to determine the second spring length on the basis of the second collision time threshold and the relative speed between the vehicle and the object.

26. (New) The information providing apparatus of claim 20, wherein the collision time includes a second collision time based upon the distance between the vehicle and the object, and upon a relative speed between the vehicle and the object;

wherein the collision time threshold includes a second collision time threshold;

wherein the controller is configured to determine if the second collision time is less than the second collision time threshold, wherein if the second collision time is not less than the second collision time threshold the second counter force is set to be zero, and wherein if the second collision time is less than the second collision time threshold, the second counter force is determined on the basis of the second elastic coefficient, the second spring length, and the distance between the vehicle and the object.

27. (New) The information providing apparatus of claim 20, wherein the controller is configured to set the correction value as the larger of the first counter force and the second counter force.

28. (New) The information providing apparatus of claim 27, wherein the controller is configured to estimate a driver demanded force and determine if the driver demanded force is greater than or equal to the correction value;

wherein the controller is configured so that when the driver demanded force is relatively large, the driver demanded force is reduced when the correction value has a nonzero value;

wherein the controller is configured so that when the driver demanded force is relatively small, the driver demanded force is reduced to zero and a braking force is generated when the correction value has a nonzero value; and

wherein the controller is configured so that when a brake pedal is depressed, the braking force is increased when the correction value has a nonzero value.

29. (New) The information providing apparatus of claim 28, wherein if the driver demanded force is greater than or equal to the correction value, the controller provides a negative value of the correction value as a driving force correction value, and the controller sets a braking force correction value at zero;

wherein if the driver demanded force is smaller than the correction value, the controller provides a negative value of the driver demanded force as the driving force correction value, and the controller provides the difference between the correction value and the driver demanded force as the braking force correction value.

30. (New) The information providing apparatus of claim 28, wherein the controller is configured so that when the driver demanded force is greater than the correction value, the controller reduces the driving force of the vehicle according to the correction value, and the controller sets a braking force correction value at zero;

wherein the controller is configured so that when the driver demanded force is smaller than the correction value, the controller sets the driving force of the vehicle to zero, and the controller generates a braking force;

wherein the controller is configured so that when the controller detects that a brake pedal is depressed, the controller increases a demanded braking force by the correction value.

31. (New) A vehicle, comprising:

an information providing apparatus that includes an operation part configured to provide a contact possibility of the vehicle contacting with an object that is present in front of the vehicle according to relative motion between the vehicle and the object;

an information providing unit configured to provide contact possibility information by applying a negative acceleration to the vehicle, the negative acceleration being produced according to a correction value that is set by the information providing unit according to the contact possibility and is applied to at least one of driving force and braking force of the vehicle; and

a controller configured to change the correction value according to a speed of the vehicle.

32. (New) The information providing apparatus of claim 1, wherein the controller is configured to determine the correction value based upon a virtual member.

33. (New) The information providing apparatus of claim 32, wherein the virtual member includes a first virtual elastic member;

wherein the first virtual elastic member is related to an absolute collision time;

wherein a first counter force is determined according to the first virtual elastic member.

34. (New) The information providing apparatus of claim 32, wherein the virtual member includes a first virtual elastic member, wherein the first virtual elastic member is related to an absolute collision time, wherein a first counter force is determined according to the first virtual elastic member;

wherein the virtual member includes a second virtual elastic member, wherein the second virtual elastic member is related to a relative collision time, wherein a second counter force is determined according to the second virtual elastic member;

wherein the correction value is determined according to the first counter force and the second counter force.